Imperial College London

Rapid Inquiry Facility (RIF) developments
Tracks 2006 conference
Thursday, August 10, 2006

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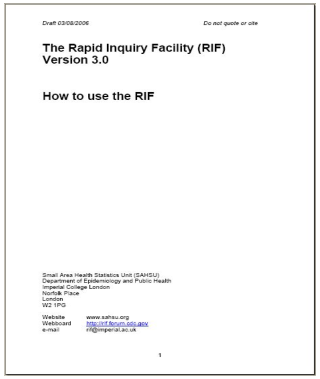
Manual and data


Draft 03/08/2006 Do not quote or cite

The Rapid Inquiry Facility (RIF)
Version 3.0

How to use the RIF

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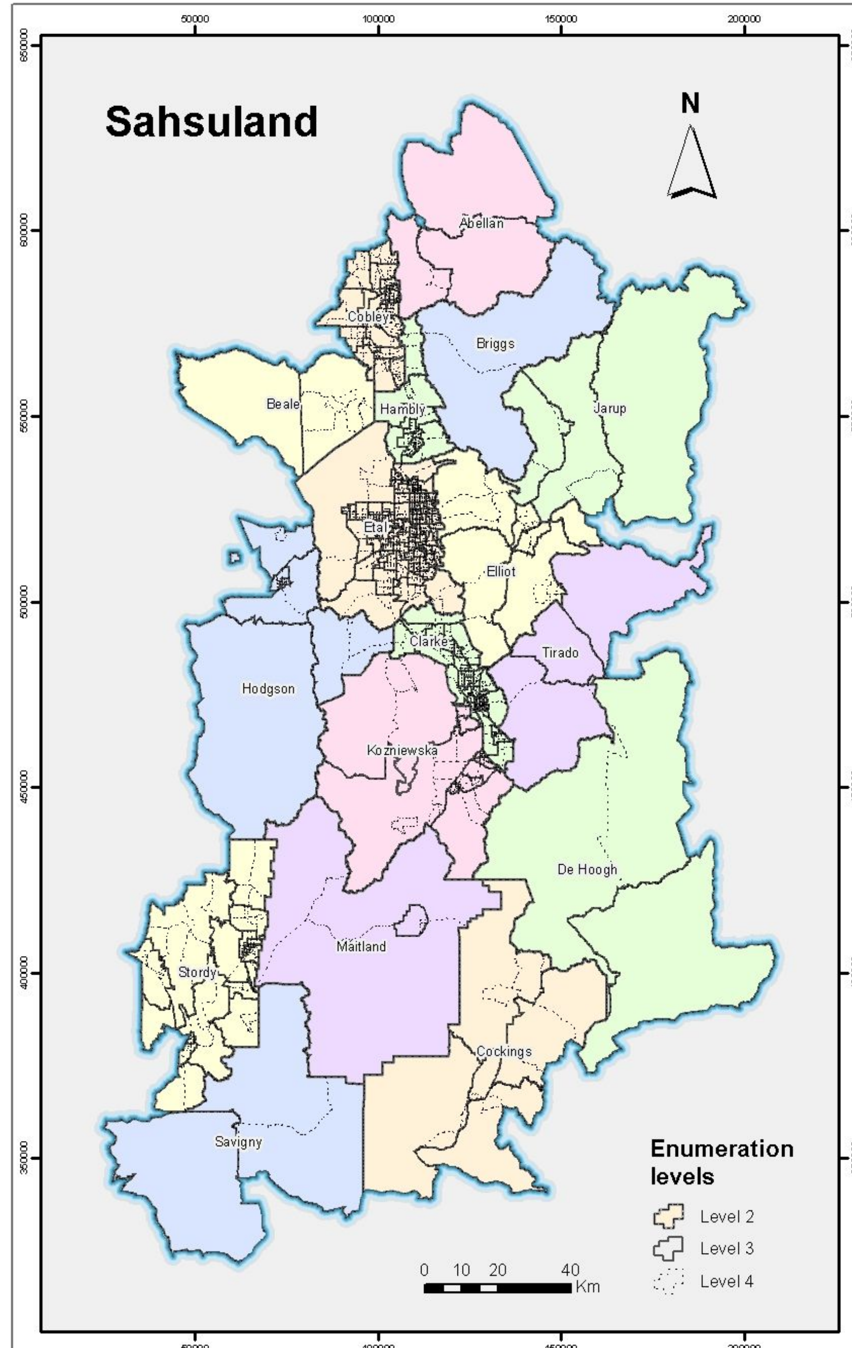


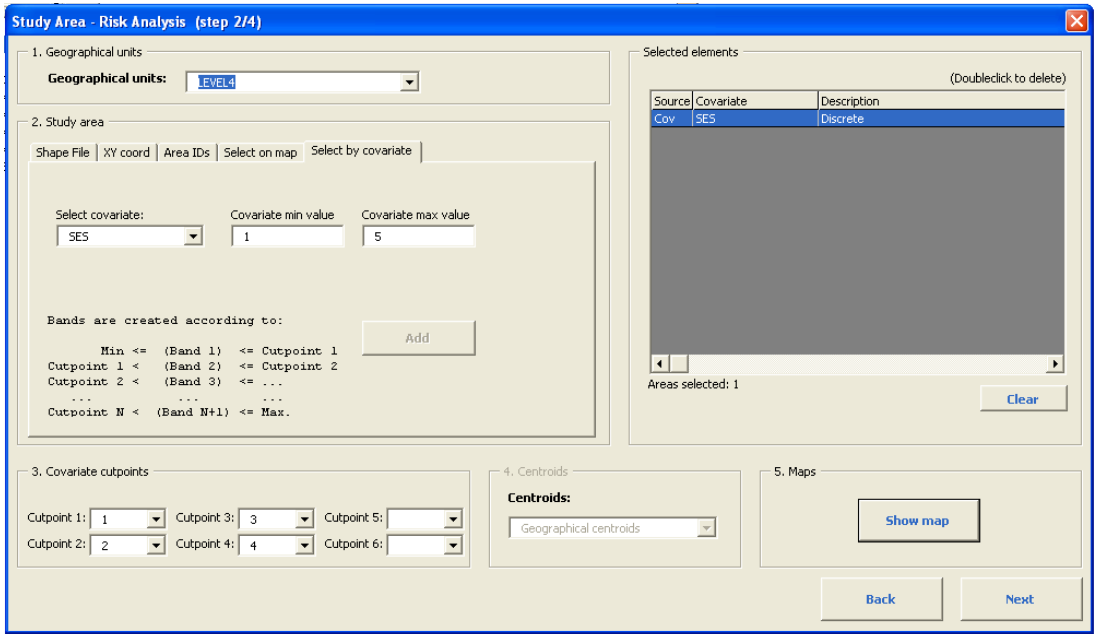
Hierarchical geography
- Four levels

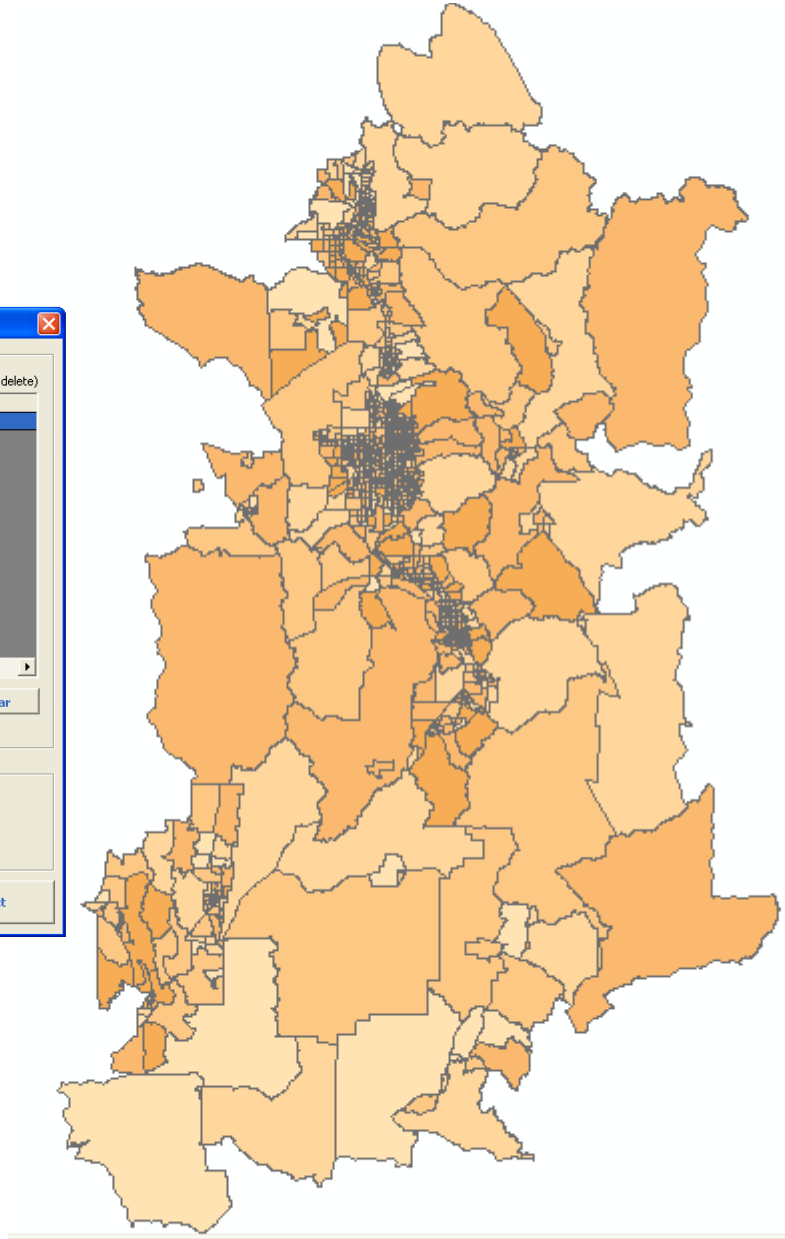
Population data 1989-1996.

Cancer incidence 1989-1996.

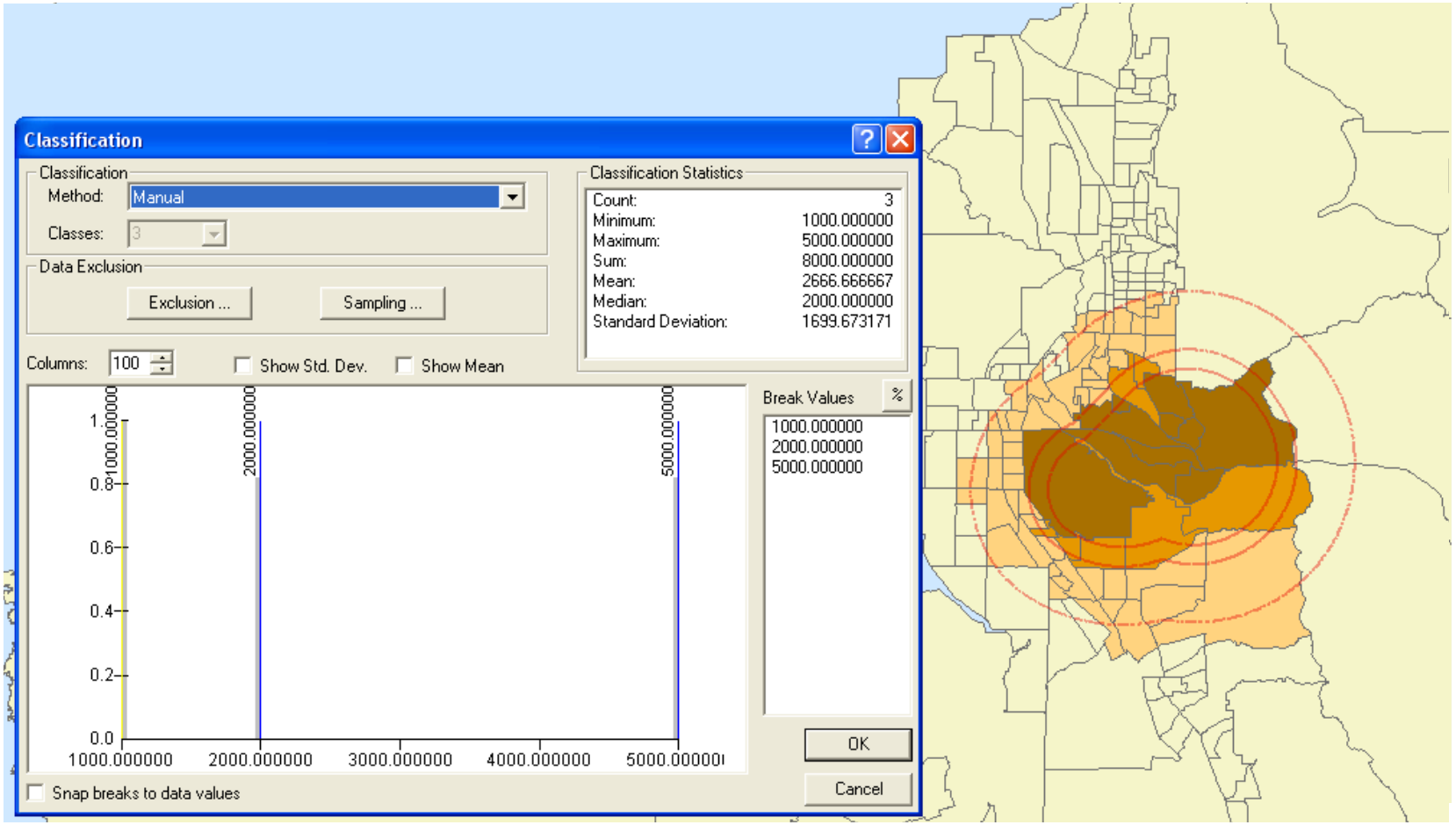
Covariates:
- socio-economic status (SES)
- ethnicity
- proximity to TRI sites

Select by Covariates





Select using shapefile attributes



RIF output - Homogeneity and linear trend

- **Homogeneity**

  Tests whether the risks in the different exposure groups are homogeneous (H_0), or show heterogeneity (H_A).

- **Poisson trend statistic**

  Tests whether the risks are homogeneous (H_0), or display a linear trend with exposure (H_A).

Homogeneity test

Homogeneity test results

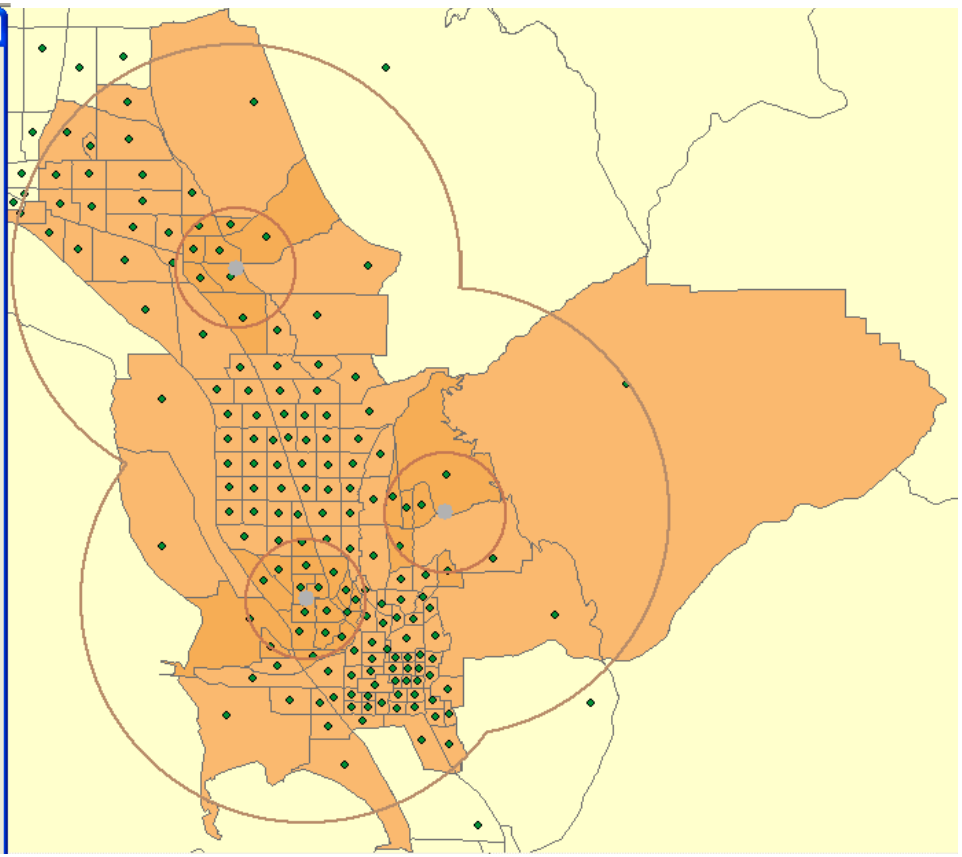
Investigation: test

Degrees of freedom: 1

Table

	With no adjustment		
	Males	Females	Both
Bands with expected < 5	0	0	0
Homogeneity chi2-statistic	0.0717	4.1873	3.0256
Homogeneity p-value	0.7892	0.0409	0.0822
Linearity chi2-statistic	N/A	N/A	N/A
Linearity p-value	N/A	N/A	N/A

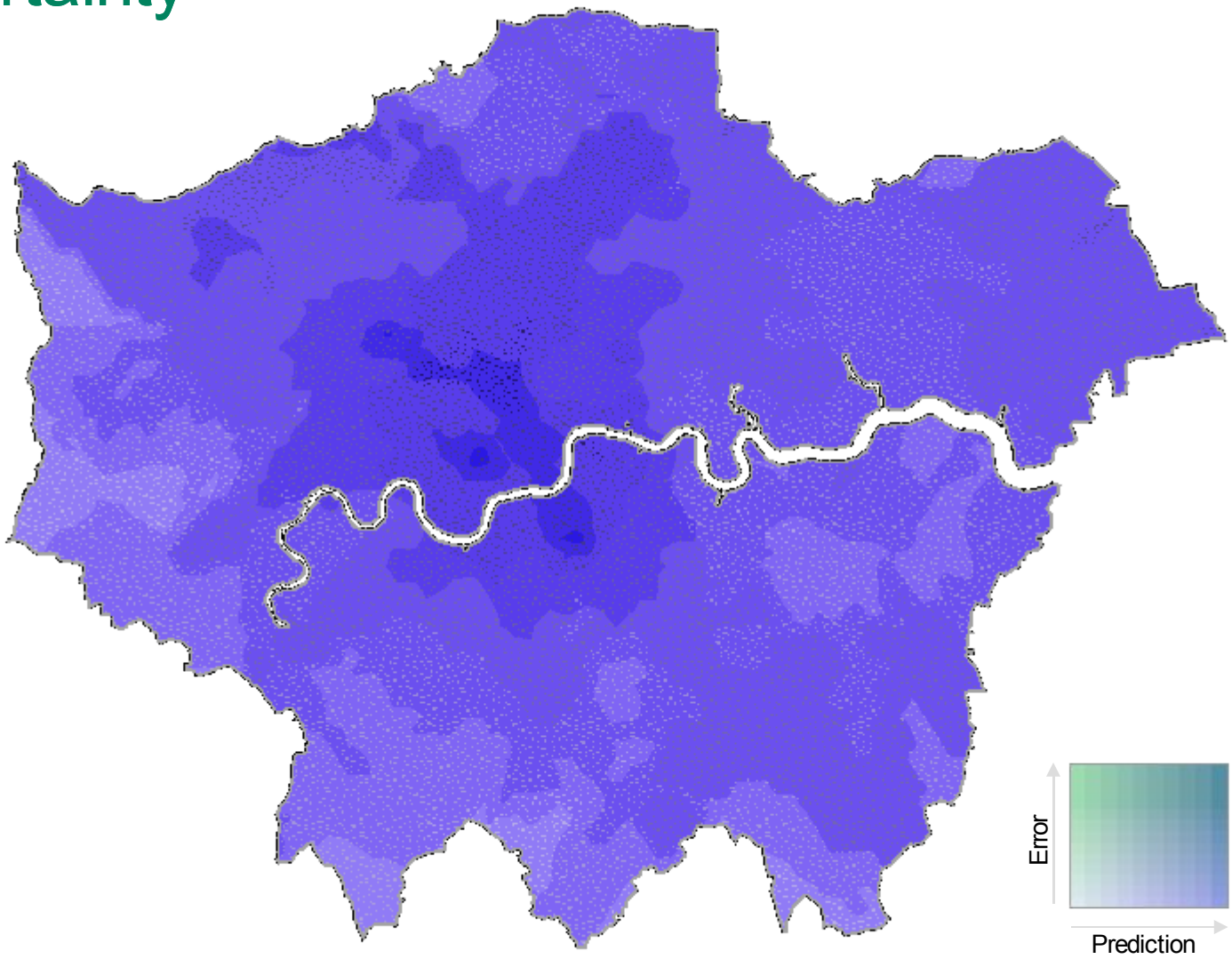
	With adjustment for covariates		
	Males	Females	Both
Bands with expected < 5	0	0	0
Homogeneity chi2-statistic	0.0352	3.6373	1.7775
Homogeneity p-value	0.8516	0.0571	0.1826
Linearity chi2-statistic	N/A	N/A	N/A
Linearity p-value	N/A	N/A	N/A



Export functionality

- Export to WinBUGs for full Bayes smoothing
  - Smoothes to the local, not global mean
  - Requires priors and processing power/time
- Export to SaTScan for cluster detection
  - Will find statistically significant clusters
- Results
  - Word reports
  - Data tables
  - Spatial data

Uncertainty



RIF EPHT work plan 2006/2007

- Test applications in two further states
  - Pennsylvania (Pittsburgh)
  - Washington state in collaboration with Prof Wartenberg, New Jersey
- Further developments of GIS Small Area Methods
- Further developments of Statistical Small Area Methods

Statistical Small Area Methods – further developments

- Assessing uncertainty
- Today: Maps showing point estimates of relative risks only
- Need measure of uncertainty
  - Confidence intervals
- Posterior probability maps
  - Jarup et a, Int J Cancer. 2002 Feb 10;97(5):695-9.

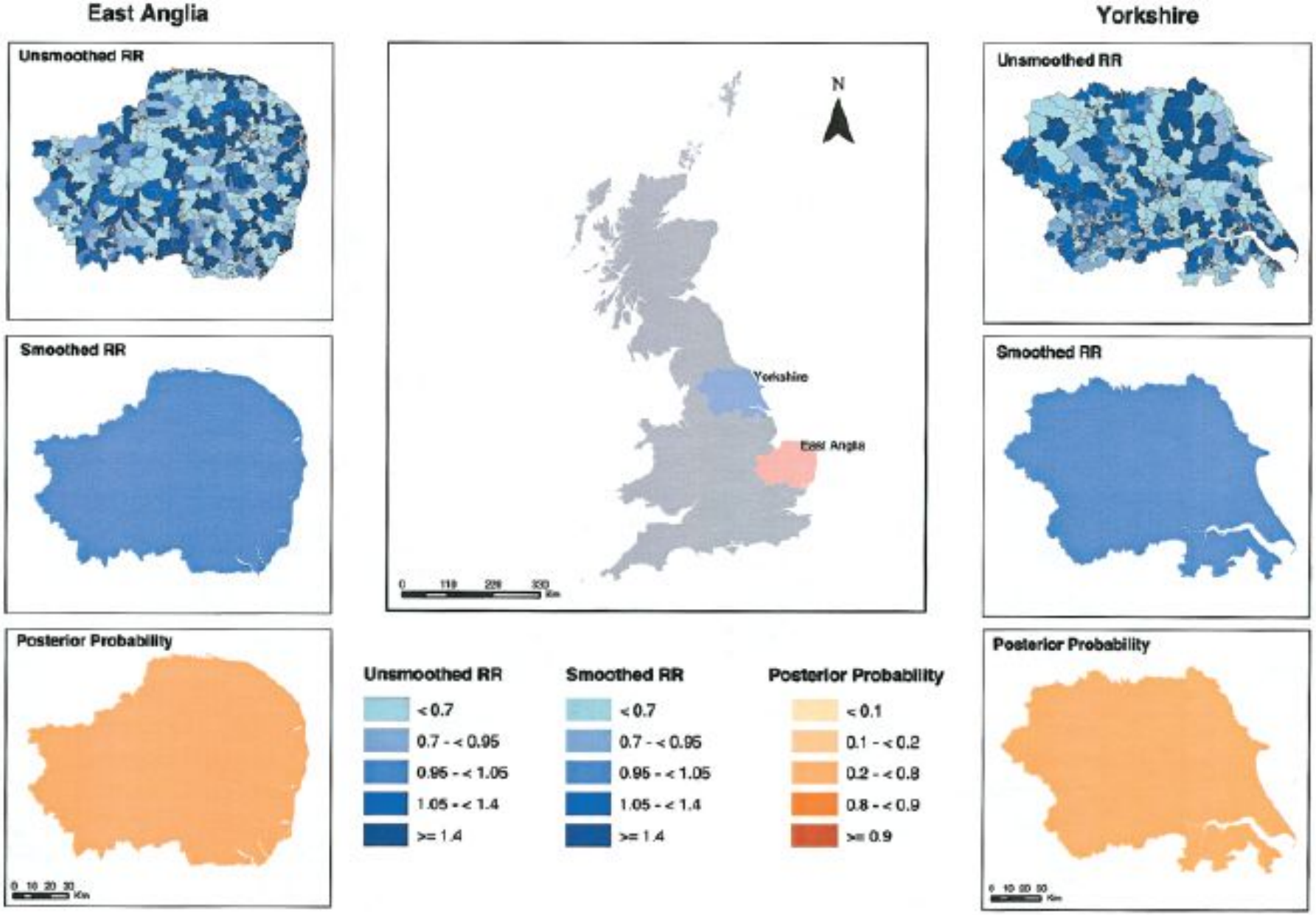


FIGURE 1 – Age- and deprivation- adjusted relative risks of prostate cancer, 1975–1991, across electoral wards in the East Anglia and Yorkshire cancer registries, unsmoothed risks (top, left and right) and after smoothing (middle, left and right) as well as the posterior probabilities (of RR > 1) (bottom, left and right).

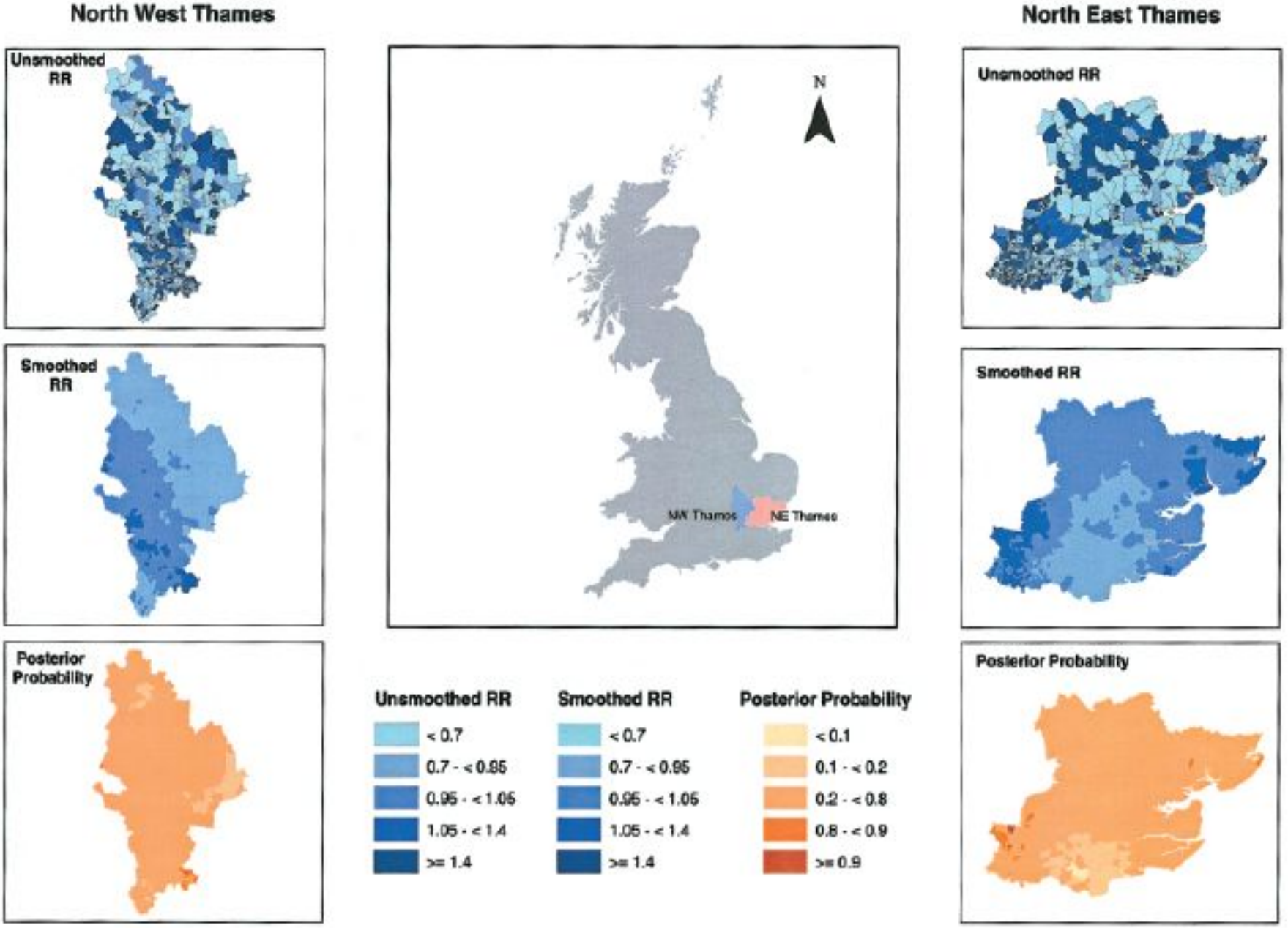


FIGURE 2 – Age- and deprivation- adjusted relative risks of prostate cancer, 1975–1991, across electoral wards in the North West and Nort East Thames cancer registries, unsmoothed risks (top, left and right) and after smoothing (middle, left and right) as well as the posterior probabilities (of RR > 1) (bottom, left and right).

Statistical Small Area Methods – further development

- Space-time interaction analysis using hierarchical space-time models
- Extend models to detect shared and specific geographical and temporal variations in two (or more) etiologically related diseases
  - Richardson et al, Stat Methods Med Res. 2006 Aug15(4):385-407.
- Simultaneous analysis of spatial variations in disease risk over several time periods – sensitivity and specificity of space-time clustering methods for detecting local clusters
- Comparing performance of hierarchical space-time models and the Scan statistics for the detection of space-time clusters

SAHSU RIF availability

- Currently beta-tests in four states
  - Utah, Florida, Pennsylvania, Washington
- Formal launch planned for December 2006
- Free-ware – no costs to users
  - Need relevant licences (Arc-GIS)
- Download from EPHT website
- Limited technical support
  - Web-board available